

**Unhappiness and Crime:
Evidence from South Africa**

Nattavudh Powdthavee

No 685

WARWICK ECONOMIC RESEARCH PAPERS

DEPARTMENT OF ECONOMICS

THE UNIVERSITY OF
WARWICK

Unhappiness and Crime: Evidence from South Africa

Nattavudh Powdthavee*
University of Warwick,

October, 2003

Abstract

This paper is the first of its kind to study quality of life responses of crime victims. Using cross-sectional data from the OHS97 survey of South Africa, we show that victims report significantly lower well-being than the non-victims, *ceteris paribus*. The calculated 'compensating variation' suggests that it would take, on average, an extra \$10,000 per month to offset the psychological costs of crime. Happiness is lower for nonvictimized respondents currently living in higher crime areas. However, we find a strong evidence for females that criminal victimization hurts, but hurts less if the crime rate on our reference group is high. (100 words).

JEL Classification: D60, I31, J10, O10, O55

Keywords: Happiness, Quality of Life, Crime, Stigma, South Africa

Approximate Word Count: 6,870 words

* Address: Department of Economics, University of Warwick, Coventry, UK, CV4 7AL. Telephone: +44 2476 28240. E-mail: N.Powdthavee@warwick.ac.uk. I am particularly grateful to Andrew Oswald, Valerie Moller, Alex Michalos, Andrew Clark, Paul Dolan, Alois Stutzer, Carol Graham, Robin Naylor, John Knight, Geeta Kingdon, Ada Ferrer-i-Carbonell, and participants from presentations at Warwick University, and the Paradoxes of Happiness in Economics Conference in Milan (2003), where the idea was first presented, for their helpful comments. All remaining errors in this paper are solely mine.

The one who throws the stone forgets; the one who is hit remembers forever.

Angolese Proverb.

Fear defeats more people than any other one thing in the world.

Ralph Waldo Emerson.

1 Introduction

Politicians around the world have been expressing concern for decades about the extent to which rising crime rates can affect the lives of individuals in the society. The growing distress over the effects of crime on individuals in rich and poor countries alike is thought to have been fueled by the perception that crime victims suffer greatly in terms of financial loss and psychological trauma from their experiences. There is also an increasing awareness among policy makers that these exposures to crime can have long-lasting impacts on the victims and those close to them. As a result, crime and the perception of personal safety are important factors in any assessment of social well-being and an individual's happiness level. Yet less attention has been paid in terms of research on the link between crime-related variables and measures of satisfaction with quality of life in general.

This paper has three aims. The first is to show that, on average, crime victims report significantly lower levels of subjective well-being than the nonvictimized. The second is to present evidence that subjective well-being may also be affected by the fear of crime as well as the direct experience of it. In other words, we test whether crime on others in the region has a negative relationship with the nonvictimized's well-being. The third is to show that, even though criminal victimization hurts, people would feel relatively better once they know that a large part of the population living in the same neighbourhood as they are is also affected by crime. The latter idea seems related to the findings of a reduced stigma for the unemployed as others' unemployment in the area rises, i.e. people may dislike unemployment, but if unemployment becomes a norm for the society they are living in, then it may not hurt as much (Clark, 2003). Using the perceived quality of life data taken from the post-apartheid South Africa in 1997, we argue below that all of the above ideas

are strongly supported by the data and that there is a robust relationship between crime-related variables and subjective measures of well-being.

We briefly discuss in Section 2 some of the key literature in psychology, sociology, and economics. Section 3 describes the dataset for South Africa. Section 4 begins empirical analysis on the correlation between criminal victimization and the reported well-being. We present in Section 5 the main results on regional crime rate, and Section 6 calculates the estimated effects of crime-related variables. Conclusions are then set out in Section 7.

2 Previous Literature

Criminal damages have so far been studied by economists in terms of pecuniary costs on individuals and the society. The cost of murder, for example, can be measured by loss in earnings for victims and accumulated public spending on policemen and court personnel to increase the probability of criminal apprehension and conviction (Becker, 1968). The current paper, however, takes a more psychological approach to the analysis of individuals' welfare following criminal victimization by looking directly at the reported subjective well-being of crime victims. Although this is not yet standard in economics, subjective well-being responses have increasingly, and successfully, been applied in the studies of unemployment (e.g., Winkelmann and Winkelmann, 1998; Frey and Stutzer, 1999; Kingdon and Knight, 2001; Blanchflower and Oswald, 2003), the role of absolute and relative income (e.g., Clark and Oswald, 1996; McBride, 2000; Easterlin, 2001; Stutzer, 2002), the impact of macroeconomics indicators (e.g., Di Tella et al, 2001; 2003), and general development and poverty issues (e.g., Ravallion and Lokshin, 2001; Graham and Pettinato, 2002; Powdthavee, 2003a). Nonetheless, despite the comments made in passing by Lord Layard (2003) on the relative importance of the negative effects of rising crime rate on happiness, empirical research in economics on the well-being of crime victims is still relatively unexplored, comparing to other areas of economic issues mentioned above, simply because adequate data are not readily available or are too unreliable for general public use.

While the link between criminal victimization measures and subjective well-being responses remains

largely ignored by economists, the idea has been studied intensively by psychologists and partly by sociologists for decades. A common result from the psychology literature is that crime victims have been shown to suffer from a variety of significant and persistent psychological problems which include, for example, depression, anxiety, fear, and post-traumatic stress disorder as well as feelings of hostility and personal violation (e.g., Atkeson et al, 1982; Davis and Friedman, 1985; Kilpatrick et al, 1985; Frieze et al, 1987; Skogan, 1987; Burnam et al, 1988, Sorenson and Golding, 1990; Norris and Kaniasty, 1994). These psychological symptoms commonly found among crime victims, especially fear and anxiety, are shown to be negatively associated with individual's subjectively measured health (Ross, 1993) and measures of subjective well-being and overall perceived quality of life (Michalos, 1991). Attitudes towards crime-related issues in the area, i.e., whether individuals view local crime to be a problem or not, has a negative impact on the reported satisfaction with the neighbourhood (e.g., Hartnagel, 1979; Parkes et al, 2002), which is, according to Fried (1984), the second most important predictor of life satisfaction after marital status. Furthermore, using data from the city of Prince George, British Columbia survey (N = 633), Michalos and Zumbo (2000) show measures of fear and actual cases of victimization to correlate negatively with measures of happiness and satisfaction with life as a whole. A recent study by Kingdon and Knight (2003) also reports a similar finding on the correlation between the reported subjective well-being and the victim of crime variable. Using a sample size of approximately 900 victimized households from the South African Labour and Development Research Unit (SALDRU) survey of 1993, they have been able to show that crime victims report significantly lower subjective well-being than the nonvictimized. However, despite growing attention on the subject by sociologists recently, the literature on empirical analysis of crime and subjective well-being is still relatively small, comparing to studies in psychology on the victim's mental health following criminal victimization.

3 Data and Descriptive Statistics

The current paper is based on a rich set of data from the October Household Survey study of South Africa for the year 1997. The October Household Survey of 1997 (OHS97), carried out by the Statistics South Africa

(StatsSA), is a nationally-representative cross-sectional survey covering around 30,000 randomly selected households across 3,000 community clusters. This general survey contains detailed information on a series of socio-demographic characteristics including - but not limited to - household composition, education, employment status, and expenditure activities. It also includes, in a section to be completed by one of the household representatives, a battery of questions on perceived quality of life and on crime committed on household members in the past year. The proxy utility measure used in this article is the measure of Perceived Quality of Life (PQOL, henceforth). This is captured by the question "Taking everything into account, how satisfied is this household with the way it lives these days?" Responses range on a 5-point scale from the lowest "1.Very dissatisfied" to the highest "5.Very satisfied". Focusing on households with PQOL measure and relevant socio-demographic characteristics recorded yields around 25,000 usable observations in as many as 2,500 community clusters in total (or around 83% of the original sample). Table 1 provides a first look at the distribution of PQOL for the sample population. The distribution in Table 1 shows a skewness in the reported quality of life towards the "satisfied" category commonly found in data on developed nations, with a mean PQOL score of 3.64 and over 16% report the maximum score of 5.

[TABLE 1 HERE]

Victim of crime status is made up from the responses to the two following questions: (i) "During the past 12 months, has this household experienced any burglaries, robberies, or housebreaking?", and (ii) "During the past 12 months, has anyone been murdered while he/she was a member of this household?". The number of property crime (i.e. burglaries, robberies, housebreaking) victims dominates the number of violent crime (i.e. murder) victims by 10 to 1: $N = 1,933$ and 188 reported property and violent crime victims, respectively. We also had to eliminate around 30 observations where respondents had answered "Yes" to both victims of property and violent crime questions for simplicity reasons. The total number of crime victims used in the analysis is therefore 2,121, giving an average crime rate across the population sample of 8.5%.

4 The Correlation Between The Victim of Crime Variable and Perceived Quality of Life Response

We assume that there exists a reported well-being function of the general form

$$R_h = H(W(V C_h; X_h; Z_h)) + \epsilon; \quad (1)$$

where R_h represents the well-being at the household-level reported by an individual, and is adequately captured by responses to a question on perceived quality of life, on a scale of 1 to 5, $H(\cdot)$ is a non-differentiable function that relates actual to reported well-being, $W(\cdot)$ is the true well-being only observable to that individual, X is a vector of private goods consumed by the entire household, Z is a set of socio-demographic characteristics across household members, and ϵ is an error term that subsumes the inability of human beings to communicate accurately the true well-being levels. The variable $V C$ is the victim of crime variable, taking the value of 1 if the household has been victimized by crime in the past 12 months and 0 otherwise. In this paper we aim to test whether the reported perceived quality of life is associated negatively with the victim of crime variable, *ceteris paribus*. Note that measures of subjective well-being and experiences of criminal victimization in the OHS97 are recorded at the household-level, and not at the individual-level. Hence, this implies that we can only make inter-household comparisons of reported well-being, and not comparisons between individuals living in the same households, in our victim of crime analysis.

To provide some information about the correlations in the raw data, Table 2 describes reported PQOL levels for different groups. In consonance with the findings in the psychology literature, respondents from the nonvictimized households report, on average, a significantly higher subjective well-being level than the respondents from the victimized households. The means of perceived quality of life for the nonvictimized and victimized households are 3.660 and 3.395, respectively. A similar result is also obtained for both male and female respondents. The figures in parentheses represent the t-statistic for the null hypothesis that the means of the two groups are the same, and in all cases the test strongly rejects at the conventional level the equality of the means for the two groups. This is our first tentative evidence of lower psychological

well-being following criminal victimization.

[TABLE 2 HERE]

A more systematic analysis of the reported PQOL data begins in Table 3. As the measure of PQOL is ordinal, not cardinal, the preferred method of estimation is by ordered probit (Zavoina and McKeley, 1975). We also correct for underestimated standard errors by including cluster controls in the estimations so as to capture any grouping effects present within the data set. See Moulton (1990) for more discussions on potential pitfalls of estimating aggregate variables on micro units when standard errors are not corrected for.

We begin by following the same format of estimation on the PQOL data as Powdthavee (2003a). The first column of Table 3 estimates a simple econometric counterpart to equation (1), excluding however personal characteristics of household members other than the PQOL respondents from the well-being regression. The dummy for victim of crime enters the regression in the theoretically expected negative way, with a z-statistic of -11.17. Quality of life seems to be monotonically increasing in household expenditure, while relative expenditure (= household expenditure/avg. household expenditure of others living in the same community) is associated, albeit insignificantly, with higher levels of reported well-being.

[TABLE 3 HERE]

Other results from Column 1 of Table 3 show that household size is negatively correlated with reported well-being, controlling for household expenditure quintiles. One possible explanation for this is that an increase in the household size may lead to a reduction in household expenditure per capita, and hence reduces the quality of life for everybody in the household (Graham and Pettinato, 2002; Powdthavee, 2003a). Controlling for household expenditure quintiles and the right to ownership of the dwelling, individuals with a telephone connection in the dwelling have reported, on average, higher PQOL levels than those without one. Black respondents have reported, on average, a significantly lower well-being score than individuals of other races, despite the fact that it has been more than three years since the abolition of apartheid law in 1994. The result is in keeping with Møller (1998)'s findings on the post-apartheid trend of reported well-being by

race in South Africa. According to Møller, the PQOL gap between black and other races, especially white, became smaller soon after the election of Nelson Mandela on April 27th, 1994, only to widen again eighteen months later from persistent income inequality, rising expectations and new anxieties experienced by the black population in the post-apartheid era. However, our results suggest that coloured rather than white individuals have reported the highest perceived well-being in 1997. The searching unemployed (i.e., those unemployed and looking for a job) and part-time workers have significantly reported lower well-being than those in full-time employment, while reported well-being is higher for PQOL respondents with higher level of education. Similar to other findings from developed countries, there is also a U-shaped relationship between well-being response and age for South Africa, minimizing around the early 40's (Warr, 1992; Clark et al, 1996). Those who were married under civil, which is a more recent type of marriage arrangement, rather than South Africa's customary or traditional law, have the highest level of well-being. One possible explanation for this could be that people who were married under the civil law may have had more freedom in choosing their current partners and have more legal rights compared to those married under the customary law. The divorced or separated, on the other hand, have reported the lowest current well-being. Similar results are obtained in Column 2 of Table 2, where we replace household expenditure quintiles for log household expenditure. The results are robust to control of current household expenditure; victim of crime variable remains significantly negative, while the coefficient of log household expenditure is positive and statistically significant from zero.

The third column introduces aggregated personal characteristics of household members other than the PQOL respondents (e.g. proportion of other male members in the household, proportion of household members other than the respondents with higher education, etc.) into the well-being regression. With these control variables, the dummy variable for victim of crime continues to be strongly negatively related with the perceived quality of life levels. In addition, increases in the proportion of other household members in the unemployed - both searching and non-searching - and in part-time employment categories, with the proportion of individuals in full-time employment being the reference point, are shown to be significantly correlated with lower reported PQOL scores. This makes sense as, holding everything else constant, a

50% full-time employed and 50% searching unemployed household will be more preferable to an individual than a 0% full-time employed and 100% searching unemployed household, given the fact that searching unemployment is the single most detrimental factor to lower well-being in our earlier estimations. The same goes for education variables; reported well-being is higher for those households with larger proportions of highly educated individuals. A similar pattern is also obtained in the fourth column where household expenditure quintiles are replaced by log household expenditure. It is therefore worth noting here that, in most comparable cases, the coefficient signs of the already identified socio-economic factors in the well-being regression equations are the same in South Africa as is the case in more-developed countries.

[TABLE 4 HERE]

Does crime make people unhappy, or are unhappy people more likely to be crime victims? According to panel data evidence, psychological distress seems to run from being a victim of crime rather than the other way round (Norris and Kaniasty, 1994; Norris, Kaniasty, and Thompson, 1997). This supports the existing notion in economics that, even though the decision to commit a crime is a behavioral choice that stems from utility maximization for the offenders, criminal victimization can be considered as exogenously given. In other words, people are much more likely to have the choice to commit a crime rather than to become one of the victims. Hence, it can be said from economic theories and panel data evidence that the direction of causality runs unambiguously from criminal victimization to well-being.

Of other interest is the role of crime type in the determination of victim of crime variable in these equations. In particular, we would like to know whether the negative correlation between victim of crime and perceived quality of life is driven by a single type of crime and not the other. In doing so, Table 4 first produces household-level evidence, replacing the victim of crime dummy for property crime (i.e. burglaries, robberies, housebreaking) and violent crime (i.e. murder) variables to Table 2, Column 4's specification. The estimated coefficients (z-statistics) for the dummies representing property and violent crimes are -0.375 (-10.92) and -0.174 (-2.01), respectively, contrasting with Davis and Friedman's (1985) finding of lower psychological well-being among the violent crime victims, comparing to property crime victims. The result

thus implies that the negative correlation between victims of crime and perceived quality of life may be largely driven by property crimes ($N = 1,933$) than by violent crimes ($N = 188$). However, it can still be concluded from our estimations that respondents from victimized households, from either property or violent crimes, have reported lower well-being than the nonvictimized households, *ceteris paribus*.

Conclusion 1 The respondents from victimized households have reported lower perceived quality of life scores, on average, than their nonvictimized counterparts.

5 The Role of Others' Crime Rate by Region, Males Versus Females

While it has been robustly established in the last section that victims of crimes are worse off than the non-victims in terms of their perceived quality of life, the relationship between crime on other societal members in the community and measures of subjective well-being remains relatively unexplored. A suggestive evidence comes from Kingdon and Knight (2003), where they find the negative relationship between the reported well-being and the victim of crime variable to be more significant for the poor-households (those defined as earning less than the household supplementary level of poverty line), where regional crime rates vis-à-vis unemployment rates are lower, comparing to areas lived by their non-poor counterparts. However, to our best knowledge, the only work that explicitly includes a crime rate variable in the happiness regressions comes from a paper by Alesina et al (2001), which compares the effects of inequality on happiness across Europe and America. By using a set of individual-level data from the US General Social Survey (1972-1994), they have been able to show for the US sample that there is a negative, albeit insignificant, relationship between the murder rate and the reported happiness scores. However, they had failed to distinguish in their regression results the effects of murder rate between individuals from households with murder victims and those from nonvictimized households.

In this section, we aim to extend the idea by Alesina et al, and, first, examine whether regional crime

rate correlates significantly with the well-being of the nonvictimized households. The standard externality of regional crime rate on others is negative: e.g. an increase in the regional crime rate may heighten the feelings of fear and insecurity for the nonvictimized households in the neighbourhood, etc. The other question of interest is whether certain groups of individuals are hurt less by crime than others. A hypothesis in economics and psychology suggests that stigmatizing effect from crime may in fact be lower in high crime rate regions. With less social disapproval towards crime victims in high crime areas, the externality from local crime rate on the overall well-being of the victimized households may be positive: e.g. the higher the regional crime rate, the better I feel about myself for being one of the victims. This is similar to the reduced stigma from unemployment in high unemployment regions (Clark, 2003).

Hence, the current section aims to test the following two hypotheses of interest:

(i) Crime on “relevant others” - i.e. other people living in the same region as the respondents - reduces the current well-being of the nonvictimized households.

(ii) The correlation between the victim of crime variable and perceived quality of life is smaller for those crime victims who have been living in an area with a high crime rate.

In doing so, we extend the well-being equation (1) to include a measure of crime on relevant others in the community, to be estimated as follows:

$$R_h = \beta_1(VC)_h + \beta_2(\overline{VC})_h + \beta_3(VC_h \otimes \overline{VC}_h) + X_{h,s}^0 + Z_{h,t}^0 + \epsilon_h; \quad (2)$$

where the additional variable, \overline{VC}_h ; represents relevant others’ crime rate measured as the proportion of victimized households in a given community cluster, and is allowed to vary across households. We expect to find the following relationship: $\beta_1 < 0$; $\beta_2 < 0$; but $\beta_3 > 0$. Victims of crime report lower well-being than the non-victims, and crime on relevant others lowers well-being for those nonvictimized households. However, crime on households hurt less when a large proportion of households in the region is also affected by crime ($\beta_3 > 0$). Furthermore, we intend to examine the role of others’ crime rate on reported well-being levels according to the gender of the PQOL respondents. The current hypothesis is that female respondents who were selected to evaluate the well-being at the household-level for everybody else may possess a very

different attitude towards crime-related issues, comparing to male respondents. For example, females tend to be more convinced that crime in their region had increased, to be more worried about being victimized (e.g. Giles-Sims, 1984; Lira and Andrade-Palos, 1993), to perceive more neighbourhood problems, to be less satisfied with their own and their family's safety in their neighbourhood, and to be less likely to walk alone in their neighbourhood at night than males (e.g. Gomme, 1988; Sprott and Doob, 1997; Michalos and Zumbo, 2000). On the other hand, females tend to communicate more to each other about their experiences of crime, whereas males have a greater unwillingness to admit or talk about their fears relating to criminal victimization in general (e.g. Stanko and Hobdell, 1993; Walklate, 1997).

[TABLE 5 HERE]

Table 5 reports the regression results on the OHS97 data by gender group. With a full set of Table 3's regression controls, Columns 1 and 4 of Table 5 reveal the estimated coefficient on victim of crime variable to be negative and significant for both males and females sub-samples, respectively. The estimated coefficient on victim of crime variable is, however, slightly more significant for females than for males, with a z-statistic of -8.88 comparing to male's -6.86. Columns 2 and 5 introduces relevant others' crime rate into the specification. This yields around 2,500 data points on regional crime rate. The victim of crime variable continues to be very strongly negatively correlated with the reported well-being for both males and females. The main effects of regional crime rate on the reported well-being scores is also negative and significant for both males and females, consistent to Alesina et al's results on the US data. This is also in keeping with the findings by Parkes et al (2002), where they found for the UK higher levels of fear vis-à-vis lower neighbourhood satisfaction scores in high crime rate areas.

It should be noted that the comparisons made so far between males and females reveal insignificant differences in the correlations between crime-related variables and the reported PQOL scores. Table 5, Columns 3 and 6, then add into the specification the interaction effects between the victim of crime dummy and the regional crime rate variable for males and females sub-sample regressions, respectively. The absolute size and the significance of the estimated coefficient on victim of crime variable drops for males, while increases

for females, with the inclusion of the interaction term. The main effect of regional crime rate on well-being remains negative for both genders, but is more significant for females than for males. The interaction term attracts a strongly positive coefficient only for females, showing that crime on households ‘hurts’ less for those female respondents living in higher crime rate regions. This is consistent to our prior expectation of a reduced stigma from criminal victimization when crime on relevant others is high.

To our best knowledge, there is no significant regional variation in the supply for both police services and victim support programs (in terms of financial or clinical helps) in South Africa (and, in any case, any regional variation will be captured by the regional dummies, and by controls allowing for correlated errors within community cluster). Nonetheless, one interpretation of the interaction term between victim of crime and crime on ‘relevant others’ variables is that it is merely capturing the effects of others’ unemployment in the area on the overall quality of life for those respondents with crime victims as household members. As it is possible that regional crime rates and regional unemployment rates are strongly positively correlated with each other, the psychological effects of crime may therefore be lower for those crime victims living in high crime rate regions, providing that they are also unemployed as well. This can be explained simply by the fact that unemployment hurts less for those living in high unemployment areas (Clark, 2003).

[TABLE 6 HERE]

Table 6 introduces a measure of unemployment on those living in the same region as the respondents into Table 5’s specification. This is measured as the ratio of unemployed individuals, which includes all household members other than the PQOL respondent and people living in other households, to all working-age individuals in a given community cluster. Columns 1 and 4 of Table 6 show that the main effect of regional crime rate on well-being continues to be negative and significant for both males and females, while the interaction between the victim of crime variable and the regional crime rate remains positive and significant only for females. These results are robust to the control for others’ unemployment in the region. In consonance with other happiness studies, the estimated coefficient on others’ unemployment in the region is negative and significant for both males and females (Clark and Oswald, 1994; Stutzer and Lalive, 2001;

Clark, 2003; Powdthavee, 2003b). Columns 2 and 5 introduce into the specification the interaction between the victim of crime variable and regional unemployment rate. The assumption is therefore that crime victims compare with those unemployed in the same region, regardless of their own unemployment status. The estimation yields a positive, albeit insignificant, coefficient on the interaction between victim of crime and regional unemployment rate variables for both males and females, whilst the interaction between victim of crime and regional crime rate variables continues to be positive and significant only for females. Columns 3 and 6 extend the analysis to include in the regressions a 3-way interaction term of regional unemployment rate with victim of crime and own unemployment status variables. This allows us to distinguish between the estimated effects of regional unemployment on nonunemployed victims and unemployed victims, respectively. The relationship between the reported well-being and others' unemployment is positive and significant only for the unemployed males from victimized households. This is in keeping with Clark (2003) and Powdthavee (2003b)'s findings of a reduced stigmatizing effect from unemployment as others' unemployment rises, which is more significant for males than for females. Similar results are obtained on the crime-related variables for both columns' regressions; the victim of crime and regional crime rate variables remain negatively correlated with the reported PQOL scores, whilst the interaction between victim of crime and regional crime rate variables continues to be positive and significant only for females. Hence, these results help to counter the earlier interpretation that crime on 'relevant others' is merely proxying the effects of others' unemployment on well-being.

The other question of interest is whether the estimated coefficients on regional crime rate are actually representing the level of fear within a given society, or that they are merely proxying for the feelings of sympathy with other crime victims in the area. This idea is very difficult to test, given the nature of our cross-sectional data and crime variables. Nonetheless, the OHS97 survey allows us to look directly at the relationships between crime and the level of perceived safety in the dwelling and in the neighbourhood, which are very closely related to the fear of crime.

Our current hypothesis is that the estimated coefficients on regional crime rate are driven by the effects of regional variations in the level of perceived safety vis-à-vis fear of crime rather than the feelings of sympathy

with the victimized. In addition, providing that non-victims feel relatively safer in their environment compared to those crime victims, it may become possible that, as the population of crime victims grows, those who are affected by crime will start feeling as if they are not alone in their fate, and hence will learn to become more comfortable and happier in their own environment. This will account for the positive coefficient on the interaction term between victim of crime and regional crime rate variables in Column 6 of Table 5's regression. Thus we are taking van Praag et al (2003)'s findings for granted that the overall quality of life depends on the different subjective domain satisfactions, one of which is the environmental or neighbourhood satisfaction levels.

In order to test this hypothesis, we estimate in Table 7 the levels of perceived safety in the dwelling and in the neighbourhood regressions on the OHS97 data. The perceived safety in the dwelling and in the neighbourhood levels used in the regressions are adequately captured by responses to the following questions: (i) "How safe do you feel in the dwelling where you live?", and, (ii) How safe do you feel living in the neighbourhood where you live?", respectively (OHS97, p.66). The possible answers were recorded on a 4-point scale, ranging from "1.Very unsafe" to "4.Very safe". The following regressions refer to prime-age female respondents only (cf. Table 5, Column 6), and are estimated using the same ordered probit method.

[TABLE 7 HERE]

The first two columns report the results for the perceived safety in the dwelling regressions, whilst the latter two produce the regression results with the responses to the perceived safety in the neighbourhood question as the independent variable. Consistent to prior expectation, Column 1 of Table 7 shows that victims of crimes report, on average, a lower level of perceived safety in the dwelling than those respondents from nonvictimized households. Regional crime rate on others is also associated negatively with the reported perceived safety in the dwelling scores, while the interaction between victim of crime and regional crime on others variables yields a positive, albeit only slightly significant, coefficient. The sum of "regional crime rate" and "the interaction between victim of crime and regional crime rate" is positive ($0.367 + 0.483 > 0$), although we cannot reject the hypothesis that regional crime rate reduces the level of perceived safety in the

dwelling for the crime victims. Other results show that people feel relative safer in their own dwelling if they live in the rural area, have a telephone in the dwelling, are of a mixed race, and are married (civil or traditional). There is also a U-shaped relationship between age the perceived safety in the dwelling response. None of the other demographic variables in Column 6, Table 5 were significant in this regression and have been dropped. The second column introduces into the estimation controls for the perceived safety levels compare to last year, captured by responses to the following question, "Do you feel (i) safer, (ii) about the same, or (iii) less safe, than you felt a year ago?" The estimated coefficients on victim of crime and regional crime rate continue to be negative and significant, while the interaction term remains positively correlated with the perceived safety in the dwelling, but is now slightly insignificant with the inclusion of additional controls.

Similar results are obtained in Columns 3's estimation of the perceived safety in the neighbourhood levels; the victim of crime variable is associated strongly with lower levels of the perceived safety in the neighbourhood scores. The estimated coefficient on regional crime rate on others is negative and significant, while the interaction term between victim of crime and regional crime rate is positive with a z-statistic of 2.75. We can reject the hypothesis that the sum of "regional crime rate" and "the interaction between victim of crime and regional crime rate" is negative ($\beta_1 + \beta_2 < 0$) at the 10% confidence interval. The test is much stronger when the perceived safety levels compare to last year are controlled for in the regression. We can reject in Column 4 of Table 7 the hypothesis that $\beta_1 + \beta_2 < 0$ at the 1% confidence interval: regional crime rate reduces the level of perceived safety in the neighbourhood for the respondents from nonvictimized households, but raises the level of perceived safety in the neighbourhood for the respondents from victimized households, ceteris paribus. The estimated coefficients on the interaction between victim of crime and regional crime rate variables in both "perceived safety in own dwelling" and "perceived safety in the neighbourhood" regressions are positive, although insignificant, for males.

Conclusion 2 Regional crime rate is associated negatively with the reported well-being of the respondents from nonvictimized households, while the correlation is positive and significant only for female respondents

from victimized household.

6 The Estimated Marginal Effects of Crime and Regional Crime Rate: Some Illustrations

Since the coefficients from ordered probits cannot be interpreted directly as marginal effects, ‘compensating expenditure variations’ can be calculated instead to illustrate the size of the estimated psychological effect of crime on households. Given that our expenditure variable is in terms of log household expenditure, compensating expenditure variations (CEV) equation can be written as follows:

$$CEV = EP \left(\exp^{\frac{\gamma_1 + \gamma_0}{\ln EP}} \right)^{\frac{1}{\gamma_0}} \quad (3)$$

where CEV is compensating expenditure variations, i.e. expenditure required to compensate an average household for a drop in psychological well-being resulting from crime, EP is current household expenditure, γ_1 represents the reference coefficient for nonvictimized, γ_0 as the coefficient for criminal victimization, and γ is the estimated coefficient on log household expenditure. The estimated effects are selectively calculated and presented for females in Table 8, based on Column 6, Table 5’s ordered probit regression.

[TABLE 8 HERE]

The results suggest that it would take an extra household expenditure of around R51,907 (or approximately US\$11,264) per month to compensate for being victimized by crime, for an average female respondent spending at the sample average household expenditure of R1,104 (or US\$240) per month. The estimates of other life events have quantitatively smaller valuations comparing to the estimated main effect of crime. For example, searching unemployment (comparing to employment with regular wages) and no formal education (comparing to the highest level of education) for the respondent is estimated to be worth about R1,685 (US\$366) and R2,776 (US\$602) for an average household spending money at around R1,104 per month (a sample mean), respectively. Thus the estimation implies crime to have the largest psychological cost com-

paring with changes in other relevant socio-demographic factors, for an average female respondent in the sample. Note that these results were based on a sample average regional crime rate of 8.34%.

In order to illustrate how regional crime rate affects the reported well-being of victims and non-victims differently, we can instead calculate for an average individual the probability of recording the highest level of PQOL (= 5) based on the coefficients of the regression, and see how this probability varies as regional crime rate on others changes. The method generalizes as it has also been used by Clark et al (2001) to illustrate for Germany the different effects of past unemployment on the reported life-satisfaction of the unemployed and those in employment. Figures are presented for females from Column 6, Table 5's ordered probits.

[TABLE 9 HERE]

Table 9 shows how the gap in the probability of recording a PQOL score of 5 between victims and non-victims reduces as regional crime rate on others rises. An initial increase in the regional crime rate from 0% to 10% reduces this gap from almost 4% to around 3.33%, while a further rise of 10% reduces this gap by a similar amount (from 3.33% to 2.74%). The estimates also imply that, controlling for other relevant factors, an average female respondent from a victimized household would have reported the same current well-being as an average female respondent from a nonvictimized household at a regional crime rate of approximately 70% ($0.422 + 0.597 \times 0.70 = 0$), which is an unusually high figure for a regional crime rate. In other words, the results suggest that around 24 observations of the female victims (or a mere 0.1% of the total sample) have reported equal or higher well-being than the non-victimized living in the same area as they are. For males, however, the estimated effect of regional crime rate is always negative, even if they have been living in an area where every other households in the sample are also crime victims.

Conclusion 3 The estimated coefficient on crime is relatively large compared to the coefficients on regional crime rate and other life events.

7 Conclusions

The aim of this paper was to examine the relatively unexplored link between subjective well-being and crime. It estimates for South Africa's micro-econometric well-being equations based on the perceived quality of life response for the year 1997. Controlling for household expenditure and relevant factors, we find that respondents from victimized households report a substantially lower subjective well-being score, on average, compared to those from nonvictimized households. Second, we show that crime on others in the area is associated with lower levels of perceived quality of life for the respondents from nonvictimized households. One interpretation is that crime on others in the neighbourhood may increase the probability of victimization and therefore heighten the levels of fear and anxiety for the non-victims living in the area. Third, we show that, although the victim of crime variable is associated sharply with lower levels of subjective well-being, the negative correlation is attenuated as crime on others rises, consistent with the social norm effect. The estimated coefficients suggest that a representative female victim living in an area where roughly 70% of other people in the neighbourhood are crime victims is indifferent in terms of current subjective well-being between victimization and non-victimization. A possible explanation is that victimized individuals may feel relatively safer in the neighbourhood if a larger part of the population living in the area also shares their experiences of criminal victimization. In addition, these results are robust to estimation allowing for control on others' unemployment in the region. The estimated effect is, however, always negative for males.

The findings reported here have important policy implications. One of them is to supply and channel sufficient professional services for the victimized. Despite the evidence presented in this article suggesting for an urgent need of mental help services for victims of crime, studies in the developed countries reveal that, at present, only a small proportion of victims receive such professional help (Golding et al, 1988; Norris et al, 1990). We anticipate the related figures to be much smaller in the less-developed countries comparing to the advanced industrial economies. Furthermore, the weak role of expenditure variable in well-being regressions casts doubt on the efficacy of governmental policy aimed solely at giving financial support for the victims. Thus, significant improvements in terms of clinical help per case of victimization is needed if the overall levels

of quality of life were to be raised in the society. Secondly, the presence of externalities linked to other crime victims in the area suggests that not everyone in the community benefits from crime prevention programs, providing that these programs are not 100% effective in taking crime away from the neighbourhood. This is because victims of crime may suffer less stigma from victimization in regions with higher crime rates, according to the results in Table 5. Given that this result holds generally, an alternative way of tackling the issue is for the authorities to take some advantages from the externalities linked to regional crime rate by encouraging better contacts among the victimized, especially in areas where there is no centralized victim support unit for crime victims to meet up should they want to. Future research should therefore focus on how these externalities could influence the rates with which these individuals can recover from victimization over time.

References

- [1] Alesina, A., Di Tella, R., and MacCulloch, R. (2001). "Inequality and Happiness: Are Europeans and Americans Different?", Harvard Institute of Economic Research, No. 1938, manuscript.
- [2] Atkeson, B., Calhoun, K., Resick, P., and Ellis, E. (1982). "Victims of Rape: Repeated Assessment of Depressive Symptoms", *Journal of Consulting and Clinical Psychology*, 50, 96-102.
- [3] Becker, G. S. (1968). "Crime and Punishment: An Economic Approach", *The Journal of Political Economy*, 76, no. 2, 169-217.
- [4] Blanchflower, D. G., and Oswald, A.J. (2003). "Well-Being Over Time in Britain and the USA", *Journal of Public Economics*, (forthcoming).
- [5] Burnam, M., Stein, J., Golding, J., Siegel, J., Sorenson, S., Forsythe, A., and Teller, C. (1988). "Sexual Assault and Mental Disorders in a Community Population", *Journal of Consulting and Clinical Psychology*, 56, 843-850.

- [6] Clark, A.E. (2003). "Unemployment as a Social Norm: Psychological Evidence from Panel Data", *Journal of Labor Economics*, 21, 323-351.
- [7] Clark, A.E., and Oswald, A.J. (1994). "Unhappiness and Unemployment", *Economic Journal*, 104, no. 424, 648-659.
- [8] Clark, A.E., and Oswald, A.J. (1996). "Satisfaction and Comparison Income", *Journal of Public Economics*, 61, 359-381.
- [9] Clark, A. E., Georgellis, Y., and Sanfey, P. (2001). "Scarring: The Psychological Impact of Past Unemployment", *Economica*, 68, no. 270, 221-41.
- [10] Clark, A.E., Oswald, A.J., and Warr, P.B. (1996). "Is Job-Satisfaction U-Shaped in Age?", *Journal of Occupational and Organizational Psychology*, 69, no. 1, 57-81.
- [11] Davis, R., and Friedman, L. (1985). "The Emotional Aftermath of Crime and Violence". In C. Figley (Ed.), *Trauma and Its Wake: The Study and Treatment of Post-traumatic Stress Disorder* (p. 90-112). New York: Brunner/Mazel.
- [12] Di Tella, R., MacCulloch R.J., Oswald, A.J. (2001). "Preferences over Inflation and Unemployment: Evidence from Surveys of Happiness", *American Economic Review*, 91, 335-341.
- [13] Di Tella, R., MacCulloch R.J., Oswald, A.J. (2003). "The Macroeconomics of Happiness", *Review of Economics and Statistics*, (forthcoming).
- [14] Easterlin, R.E. (2001). "Income and Happiness: Towards a Unified Theory", *Economic Journal*, 111, 465-484.
- [15] Frey, B.S. and Stutzer, A. (1999). "Measuring Preferences by Subjective Well-being", *Journal of Institutional and Theoretical Economics*, 155, 4, 755-788.
- [16] Fried, M. (1984). "The Structure and Significance of Community Satisfaction", *Population and Environment*, 7, 61-86.

- [17] Frieze, I., Hymer, S., and Greenberg, M. (1987). "Describing the Crime Victim: Psychological Reactions to Victimization", *Professional Psychology: Research and Practice*, 18, 299-315.
- [18] Giles-Sims, J. (1984). "A Multivariate Analysis of Perceived Likelihood of Victimization and Degree of Worry about Crime among Older People", *Victimology: An International Journal*, 9, no. 2, 222-233.
- [19] Golding, J., Stein, J., Siegel, J., Burnam, M., and Sorenson, S. (1988). "Sexual Assault History and Use of Health and Mental Health Services", *American Journal of Community Psychology*, 16, 625-644.
- [20] Gomme, I. M. (1988). "The Role of Experience in the Production of Fear of Crime: A Test of a Causal Model", *Canadian Journal of Criminology*, 30, 67-76.
- [21] Graham, C., and Pettinato, S. (2002). *Happiness and Hardship: Opportunity and Insecurity in New Market Economies*. Brookings Institution Press.
- [22] Hartnagel, T.E. (1979). "The Perception and Fear of Crime: Implications for Neighbourhood Cohesion, Social Activity, and Community Affect", *Social Forces*, 58, 176-1993.
- [23] Kilpatrick, D., Best, C., Veronen, L., Amick, A., Villeponteau, L., and Ruß, G. (1985). "Mental Health Correlates of Victimization: A Random Community Survey", *Journal of Consulting and Clinical Psychology*, 53, 886-873.
- [24] Kingdon, G. and Knight, J.B. (2001). "Unemployment in South Africa: the nature of the beast", Center for the Study of African Economies: University of Oxford, manuscript.
- [25] Kingdon, G. and Knight, J.B. (2003). "Well-Being Poverty Versus Income Poverty and Capabilities Poverty?", Center for the Study of African Economies: University of Oxford, manuscript.
- [26] Layard, R. (2003). "Happiness: Has Social Science a Clue?", Lionel Robbins Memorial - Lectures delivered at London School of Economics, 3rd-5th of March, 2003.
- [27] Lira, L. R. and Andrade-Palos, P. (1993). "Fear of Victimization in Mexico", *Journal of Community and Applied Social Psychology*, 3, 41-51.

- [28] McBride, M.J. (2001). "Relative Income Effects on Subjective Well-Being in the Cross-section", *Journal of Economic Behaviour and Organization*, 45, 251-278.
- [29] Michalos, A.C. (1991). *Global Report on Student Well-Being, Volume 1: Life Satisfaction and Happiness*. Springer-Verlag: New York.
- [30] Michalos, A.C., and Zumbo, B.D. (2000). "Criminal Victimization and The Quality of Life", *Social Indicator Research*, 50, 245-295.
- [31] Møller, V. (1998). "Quality of Life in South Africa: Post-Apartheid Trends", *Social Indicators Research*, 43, 27-68.
- [32] Moulton, B.R. (1990). "An Illustration of a Pitfall in Estimating the Effects of Aggregate Variables on Micro Units", *Review of Economics and Statistics*, 72, 334-38.
- [33] Norris, F., and Kaniasty, K. (1992). "A Longitudinal Study of the Effects of Various Crime Prevention Strategies on Criminal Victimization, Fear of Crime, and Psychological Distress", *American Journal of Community Psychology*, 20, 625-648.
- [34] Norris, F., Kaniasty, K., and Scheer, D. (1990). "A Longitudinal Study of the Various Effects of Crime Prevention Strategies on Criminal Victimization, Fear of Crime, and Psychological Distress", *American Journal of Community Psychology*, 20, 625-648.
- [35] Norris, F., Kaniasty, K., and Thompson, M. (1997). "The Psychological Consequences of Crime: Findings from a Longitudinal Population-based Study", in Davis, R.C. et al (eds.), *Victims of Crime*, Sage Publication, Thousand Oaks, California.
- [36] Parkes, A., Kearns, A., and Atkinson, R. (2002). "What Makes People Dissatisfied with their Neighbourhood?", *Urban Studies*, 39, no. 13, 2413-2438.

- [37] Powdthavee, N.S. (2003a). "Is the Structure of Happiness Equation the Same in Poor and Rich Countries? The Case of South Africa", The Warwick Economics Research Paper Series (TWERPS), no.675, manuscript.
- [38] Powdthavee, N.S. (2003b). "Are there Regional Variations in the Psychological Cost of Unemployment in South Africa? Evidence from SALDRU93", Department of Economics: University of Warwick, manuscript.
- [39] Ravallion, M., and Lokshin, M. (2001). "Identifying Welfare Effects from Subjective Questions", *Economica*, 68, 335-357.
- [40] Ross, C.E. (1993). "Fear of Victimization and Health", *Journal of Quantitative Criminology*, 9, 159-175.
- [41] Skogan, W. (1987). "The Impact of Victimization on Fear", *Crime and Delinquency*, 33, 135-154.
- [42] Sorenson, S., and Golding, J., (1990). "Depressive Sequelae of Recent Criminal Victimization", *Journal of Traumatic Stress*, 3, 337-350.
- [43] Sprott, J. B. and Doob, A.N. (1997). "Fear, Victimization, and Attitudes to Sentencing, the Courts, and the Police", *Canadian Journal of Criminology*, 39, 275-291.
- [44] Stanko, E. and Hobdell, K. (1993). "Assault on Men: Masculinity and Male Victimization", *British Journal of Criminology*, 33, 400-415.
- [45] Stutzer, A. (2002). "The Role of Income Inspirations in Individual Happiness", Institute for Empirical Research in Economics: University of Zurich, manuscript.
- [46] Stutzer, A., and Lalive, R. (2001). "The Role of Social Work Norms in Job Searching and Subjective Well-Being", Institute for Empirical Research in Economics: University of Zurich, manuscript.
- [47] van Praag, B.M., Frijters, P., and Ferrer-i-Carbonell, A. (2003). "The Anatomy of Subjective Well-Being", *Journal of Economic Behaviour and Organization*, 51, 29-49.

[48] Walklate, S.(1997). "Risk and Criminal Victimization", *British Journal of Criminology*, 37, 35-45.

[49] Warr, P.B. (1992). "Age and Occupational Well-Being", *Psychology and Aging*, 7, no. 1, 37-45.

[50] Winkelmann, L. and Winkelmann, R. (1998). "Why Are the Unemployed So Unhappy?", *Economica*, 65, no. 257, 1-15.

[51] Zavoina, R. and McKelvey, W. (1975). "A Statistical Model for the Analysis of Ordinal-Level Dependent Variable", *Journal of Mathematical Sociology*, 4, 103-120.

Table 1: Distribution of Perceived Quality of Life for South Africa, 1997

Perceived Quality of Life	Observations	Percentage	Cumulation
Very Dissatisfied	860	3.45%	3.45%
Dissatisfied	2801	11.23%	14.68%
Neither	4951	19.84%	34.52%
Satisfied	12238	49.05%	83.57%
Very Satisfied	4099	16.43%	100.00%
Total	24949	100%	100%

Source: October Household Survey (OHS), 1997.

Table 2: Victim of Crime and Perceived Quality of Life Means, By Category

Categories	Observations	Percentage	Mean Perceived Quality of Life
Nonvictim	22828	91.99%	3.660
Victim	2121	8.01%	3.395 (11.78)
Male; nonvictim	7215	90.46%	3.677
Male; victim	761	9.54%	3.440 (6.02)
Female; nonvictim	15613	91.50%	3.653
Female; victim	1360	8.50%	3.370 (10.13)

Note: Values in parentheses are t-statistics based on the test that the two populations have equal means.

Table 3: Perceived Quality of Life Regressions with Victim of Crime Variable (Ordered Probit Results)

	(1)		(2)		(3)		(4)	
	Coefficient	z-ratio	Coefficient	z-ratio	Coefficient	z-ratio	Coefficient	z-ratio
Victim of Crime (=1)	-0.345	(-11.17)	-0.348	(-11.34)	-0.353	(-10.82)	-0.357	(-10.97)
A) Expenditure Variables								
2nd Expenditure Quintile	0.151	(4.76)			0.161	(4.28)		
3rd Expenditure Quintile	0.237	(8.04)			0.245	(7.13)		
4th Expenditure Quintile	0.305	(8.79)			0.300	(7.57)		
5th Expenditure Quintile (Highest)	0.323	(8.24)			0.311	(7.09)		
Ln(Household Expenditure)			0.095	(7.36)			0.081	(5.68)
Relative Expenditure	0.003	(1.21)	-0.001	(-0.19)	0.003	(1.12)	-0.000	(-0.09)
B) Household Characteristics								
Household Size	-0.026	(-7.06)	-0.024	(-6.67)	-0.019	(-4.75)	-0.017	(-4.35)
Urban (=1)	-0.056	(-1.83)	-0.051	(-1.65)	-0.072	(-2.20)	-0.066	(-2.01)
Home Ownership (=1)	0.029	(1.08)	0.022	(0.82)	0.030	(0.99)	0.024	(0.81)
Phone in Dwelling (=1)	0.175	(6.54)	0.164	(6.16)	0.174	(6.16)	0.164	(5.85)
C) Personal Characteristics								
Race: Coloured	0.316	(5.60)	0.309	(5.51)	0.298	(5.04)	0.292	(4.96)
Race: Indian	0.165	(2.64)	0.132	(2.10)	0.131	(2.06)	0.099	(1.56)
Race: White	0.156	(3.73)	0.100	(2.36)	0.123	(2.80)	0.068	(1.54)
Male (=1)	-0.025	(-1.16)	-0.028	(-1.31)	-0.049	(-2.07)	-0.049	(-2.11)
Unemp; Looking for work	-0.145	(-6.30)	-0.145	(-6.31)	-0.126	(-5.19)	-0.127	(-5.23)
Unemp; Not looking for work	-0.091	(-1.54)	-0.091	(-1.52)	-0.088	(-1.41)	-0.089	(-1.42)
Working part-time	-0.148	(-3.59)	-0.150	(-3.65)	-0.127	(-2.77)	-0.128	(-2.82)
Housewife/Students	-0.031	(-1.44)	-0.033	(-1.49)	-0.047	(-2.05)	-0.049	(-2.15)
Retired	0.022	(0.61)	0.037	(1.01)	0.013	(0.30)	0.021	(0.50)
Disabled	-0.093	(-1.18)	-0.086	(-1.09)	-0.101	(-1.09)	-0.097	(-1.03)
Education: STD 1-3	-0.048	(-1.05)	-0.045	(-1.00)	-0.016	(-0.31)	-0.013	(-0.25)
Education: STD 4-6	0.032	(1.08)	0.043	(1.45)	0.053	(1.62)	0.062	(1.88)
Education: STD 7-9	0.060	(2.15)	0.076	(2.73)	0.081	(2.64)	0.093	(3.02)
Education: STD 10 and higher	0.180	(5.73)	0.193	(6.18)	0.151	(4.39)	0.159	(4.63)
Age	-0.012	(-2.96)	-0.013	(-3.07)	-0.011	(-2.37)	-0.011	(-2.41)
Age ² /100	0.013	(2.64)	0.014	(2.80)	0.011	(1.97)	0.011	(2.06)

Table 3 (continued)

	(1)		(2)		(3)		(4)	
	Coefficient	z-ratio	Coefficient	z-ratio	Coefficient	z-ratio	Coefficient	z-ratio
Married; Civil	0.102	(3.38)	0.106	(3.52)	0.117	(3.16)	0.121	(3.27)
Married; Traditional (Custom)	0.002	(0.07)	0.005	(0.16)	0.001	(0.02)	0.004	(0.09)
Living together with partner	-0.026	(-0.66)	-0.029	(-0.73)	-0.000	(-0.00)	-0.005	(-0.11)
Widower/widow	-0.088	(-2.35)	-0.089	(-2.37)	-0.073	(-1.64)	-0.075	(-1.69)
Divorced/separated	-0.130	(-2.87)	-0.127	(-2.80)	-0.105	(-1.84)	-0.103	(-1.80)
D) Personal Characteristics of Other HH members								
Proportion of other male members in the household					0.032	(1.23)	0.032	(1.22)
Proportion of other household members who were								
Unemp; Looking for work					-0.208	(-6.95)	-0.212	(-7.10)
Unemp; Not looking for work					-0.169	(-2.13)	-0.171	(-2.16)
Working part-time					-0.235	(-4.30)	-0.238	(-4.38)
Housewife/Students					-0.076	(-2.59)	-0.077	(-2.60)
Retired					0.076	(1.36)	0.091	(1.65)
Disabled					-0.050	(-0.48)	-0.040	(-0.38)
Proportion of other household members with								
Education: STD 1-3					-0.038	(-0.63)	-0.040	(-0.66)
Education: STD 4-6					0.030	(-0.70)	0.038	(0.89)
Education: STD 7-9					0.059	(1.55)	0.077	(2.04)
Education: STD 10 and higher					0.142	(3.32)	0.157	(3.67)
Province dummies (9)	Yes		Yes		Yes		Yes	
Relation to head of household (9)	Yes		Yes		Yes		Yes	
N	24945		24945		20630		20630	
Log Likelihood	-32112.7380		-32142.018		-26459.620		-26487.704	
Pseudo R ²	0.0316		0.0307		0.0354		0.0343	

Note: Relative expenditure = household monthly expenditure/average community household expenditure. Reference variables are: 1st expenditure quintile, black (race), working full-time (employment status), no education (education level), never married (marital status).

Table 4: Perceived Quality of Life Regression with Victim of Crime Variable, by Crime Type

	Crime by crime type	
	Coefficient	z-ratio
Victim of burglaries, robberies, or housebreaking	-0.375	(-10.92)
Victim of having other household members murdered	-0.174	(-2.01)
A) Expenditure Variables	Yes	
B) Household Characteristics	Yes	
C) Personal Characteristics	Yes	
D) Personal Characteristics of Other HH members	Yes	
Province dummies (9)	Yes	
Relation to head of household (9)	Yes	
N	20630	
Log Likelihood	-26485.007	
Pseudo R ²	0.0344	

Note: Out of 2121 reported victim of crime, 1933 were reported victim of property crime (i.e. burglaries, robberies, or housebreaking), and 188 were reported victim of violent crime (i.e. murder).

Table 5: Perceived Quality of Life with Victim of Crime Variable and Average Crime Rate on Others in the Community, By Gender (Ordered Probit Results)

	Male				Female	
	(1)	(2)	(3)	(4)	(5)	(6)
Victim of Crime (=1)	-0.370 (-6.86)	-0.360 (-6.76)	-0.323 (-4.43)	-0.352 (-8.88)	-0.341 (-8.69)	-0.422 (-8.23)
Average Crime Rate on Others in the Community		-0.286 (-2.00)	-0.244 (-1.63)		-0.282 (-2.38)	-0.383 (-3.10)
Victim of Crime*Avg. Crime Rate on Others			-0.278 (-0.69)			0.597 (2.16)
A) Expenditure Variables						
Ln(Household Expenditure)	0.038 (1.81)	0.039 (1.87)	0.039 (1.86)	0.106 (5.76)	0.109 (5.92)	0.109 (5.92)
Relative Expenditure	0.002 (0.53)	0.001 (0.43)	0.001 (0.44)	-0.004 (-0.82)	-0.005 (-1.01)	-0.005 (-1.01)
B) Household Characteristics						
Household Size	-0.008 (-1.00)	-0.008 (-0.99)	-0.008 (-0.98)	-0.019 (-4.28)	-0.020 (-4.29)	-0.019 (-4.25)
Urban (=1)	-0.040 (-0.84)	-0.030 (-0.63)	-0.031 (-0.64)	-0.077 (-2.11)	-0.068 (-1.84)	-0.067 (-1.81)
Home Ownership (=1)	0.052 (1.20)	0.057 (1.30)	0.056 (1.30)	0.011 (0.31)	0.012 (0.32)	0.013 (0.35)
Phone in Dwelling (=1)	0.206 (4.28)	0.205 (4.27)	0.205 (4.27)	0.145 (4.55)	0.148 (4.63)	0.150 (4.69)
C) Personal Characteristics						
Race: Coloured	0.186 (2.63)	0.187 (2.64)	0.188 (2.65)	0.344 (4.76)	0.344 (4.80)	0.342 (4.77)
Race: Indian	0.046 (0.47)	0.056 (0.57)	0.056 (0.57)	0.127 (1.62)	0.131 (1.64)	0.133 (1.68)
Race: White	-0.071 (-1.07)	-0.059 (-0.88)	-0.058 (-0.86)	0.153 (2.87)	0.159 (2.98)	0.159 (2.98)
Unemp; Looking for work	-0.198 (-4.56)	-0.200 (-4.60)	-0.201 (-4.62)	-0.101 (-3.46)	-0.100 (-3.41)	-0.101 (-3.44)
Unemp; Not looking for work	-0.087 (-0.72)	-0.093 (-0.77)	-0.094 (-0.77)	-0.098 (-1.31)	-0.098 (-1.30)	-0.098 (-1.30)
Working part-time	-0.160 (-2.16)	-0.159 (-2.14)	-0.159 (-2.13)	-0.119 (-2.11)	-0.115 (-2.04)	-0.116 (-2.06)
Housewife/Students	-0.090 (-2.27)	-0.091 (-2.30)	-0.091 (-2.30)	-0.034 (-1.25)	-0.035 (-1.27)	-0.036 (-1.30)
Retired	-0.026 (-0.33)	-0.027 (-0.34)	-0.028 (-0.36)	0.038 (0.75)	0.038 (0.75)	0.036 (0.71)
Disabled	-0.258 (-1.34)	-0.265 (-1.39)	-0.266 (-1.40)	-0.026 (-0.24)	-0.024 (-0.23)	-0.024 (-0.22)
Education: STD 1-3	-0.059 (-0.60)	-0.059 (-0.60)	-0.060 (-0.62)	0.006 (0.09)	0.006 (0.10)	0.006 (0.09)
Education: STD 4-6	0.093 (1.42)	0.092 (1.41)	0.092 (1.41)	0.054 (1.39)	0.057 (1.45)	0.057 (1.46)

Table 5 (continued)

	Male				Female	
	(1)	(2)	(3)	(4)	(5)	(6)
Education: STD 7-9	0.118 (2.05)	0.118 (2.05)	0.117 (2.04)	0.083 (2.23)	0.085 (2.30)	0.085 (2.31)
Education: STD 10 and higher	0.211 (3.28)	0.210 (3.27)	0.209 (3.26)	0.136 (3.32)	0.139 (3.40)	0.137 (3.36)
Age	0.001 (0.11)	0.000 (0.04)	0.000 (0.04)	-0.017 (-3.11)	-0.017 (-3.11)	-0.017 (-3.14)
Age^2/100	-0.001 (-0.10)	-0.000 (-0.03)	-0.000 (-0.03)	0.018 (2.70)	0.018 (2.72)	0.018 (2.75)
Married; Civil	0.065 (0.93)	0.065 (0.94)	0.066 (0.94)	0.157 (3.47)	0.154 (3.42)	0.155 (3.43)
Married; Traditional (Custom)	-0.088 (-1.17)	-0.089 (-1.19)	-0.088 (-1.19)	0.047 (1.00)	0.047 (0.99)	0.047 (1.00)
Living together with partner	-0.018 (-0.23)	-0.018 (-0.23)	-0.017 (-0.22)	0.011 (0.19)	0.010 (0.18)	0.010 (0.18)
Widower/widow	-0.118 (-0.93)	-0.116 (-0.91)	-0.118 (-0.93)	-0.061 (-1.26)	-0.063 (-1.31)	-0.065 (-1.33)
Divorced/separated	-0.207 (-1.29)	-0.210 (-1.30)	-0.208 (-1.29)	-0.089 (-1.45)	-0.088 (-1.43)	-0.088 (-1.44)
D) Personal Characteristics of Other HH members						
Proportion of other male members in the household	0.002 (0.04)	0.003 (0.06)	0.003 (0.06)	0.011 (0.33)	0.011 (0.35)	0.012 (0.36)
Proportion of other household members who were						
Unemp; Looking for work	-0.138 (-2.71)	-0.142 (-2.79)	-0.142 (-2.78)	-0.256 (-6.99)	-0.255 (-6.97)	-0.257 (-7.01)
Unemp; Not looking for work	-0.321 (-2.36)	-0.325 (-2.39)	-0.325 (-2.39)	-0.131 (-1.34)	-0.132 (-1.35)	-0.133 (-1.36)
Working part-time	-0.103 (-1.15)	-0.102 (-1.13)	-0.102 (-1.14)	-0.320 (-4.60)	-0.315 (-4.54)	-0.319 (-4.58)
Housewife/Students	0.001 (0.01)	-0.003 (-0.06)	-0.002 (-0.04)	-0.125 (-3.49)	-0.125 (-3.49)	-0.127 (-3.54)
Retired	0.259 (2.54)	0.250 (2.44)	0.251 (2.45)	0.004 (0.06)	0.000 (0.00)	0.000 (0.00)
Disabled	0.011 (0.07)	0.005 (0.03)	0.007 (0.04)	-0.063 (-0.47)	-0.063 (-0.46)	-0.064 (-0.47)
Proportion of other household members with						
Education: STD 1-3	-0.089 (-0.76)	-0.089 (-0.76)	-0.087 (-0.74)	-0.011 (-0.16)	-0.012 (-0.16)	-0.010 (-0.14)
Education: STD 4-6	0.047 (0.63)	0.048 (0.64)	0.048 (0.64)	0.029 (0.58)	0.029 (0.57)	0.030 (0.59)
Education: STD 7-9	0.052 (0.74)	0.055 (0.78)	0.055 (0.79)	0.079 (1.77)	0.080 (1.78)	0.082 (1.82)
Education: STD 10 and higher	0.249 (3.20)	0.251 (3.21)	0.252 (3.24)	0.105 (2.10)	0.107 (2.15)	0.108 (2.17)
Province dummies (9)	Yes	Yes	Yes	Yes	Yes	Yes
Relation to head of household (9)	Yes	Yes	Yes	Yes	Yes	Yes
N	6324	6324	6324	14306	14306	14306
Log Likelihood	-8083.4958	-8080.5830	-8080.2045	-18354.6920	-18348.3830	-18344.0890
Pseudo R^2	0.0368	0.0372	0.0372	0.0358	0.0361	0.0363

Note: Absolute z-values in parentheses; other controls as in Table 3.

Table 6: Perceived Quality of Life with Average Others' Unemployment in the Community
(Ordered Probit Results)

	Male			Female		
	(1)	(2)	(3)	(4)	(5)	(6)
Victim of Crime (=1)	-0.323 (-4.43)	-0.331 (-3.95)	-0.331 (-3.95)	-0.422 (-8.23)	-0.455 (-8.40)	-0.454 (-8.37)
Average Crime Rate on Others in the Community	-0.244 (-1.63)	-0.245 (-1.64)	-0.244 (-1.63)	-0.384 (-3.11)	-0.386 (-3.12)	-0.386 (-3.12)
Victim of Crime*Avg. Crime Rate on Others	-0.278 (0.69)	-0.264 (-0.64)	-0.259 (-0.63)	0.598 (2.16)	0.600 (2.21)	0.597 (2.20)
Average Others' Unemployment in the Community	-0.114 (-2.96)	-0.117 (-2.93)	-0.102 (-2.30)	-0.069 (-3.11)	-0.081 (-3.47)	-0.064 (-1.90)
Victim of Crime*Avg. Unemployment on Others		0.030 (0.24)	-1.127 (4.83)		0.140 (1.57)	-0.183 (-0.38)
Victim of Crime*Unemp.*Avg. Unemp. on Others			1.160 (4.77)			0.327 (0.69)
A) Expenditure Variables	Yes	Yes	Yes	Yes	Yes	Yes
B) Household Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
C) Personal Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
D) Personal Characteristics of Other HH members	Yes	Yes	Yes	Yes	Yes	Yes
Province dummies (9)	Yes	Yes	Yes	Yes	Yes	Yes
Relation to head of household (9)	Yes	Yes	Yes	Yes	Yes	Yes
N	6324	6324	6324	14305	14305	14305
Log Likelihood	-8080.0604	-8080.0228	-8079.8293	-18341.547	-18339.781	-18339.571
Pseudo R^2	0.0372	0.0372	0.0373	0.0363	0.0364	0.0364

Note: Average others' unemployment in the community is measured as the ratio of unemployed individuals other than the PQOL respondents to all working-age individuals in the community.

Table 7: Safety in Own Dwelling and in the Neighbourhood, Victim of Crime Variable and Regional Crime Rates, (Ordered Probit Results on the Female Sample)

	Safety in own dwelling		Safety in the neighbourhood	
	(1)	(2)	(3)	(4)
Victim of Crime (=1)	-0.583 (-11.51)	-0.463 (-8.59)	-0.602 (-10.58)	-0.478 (-8.57)
Average Crime Rate on Others in the Community	-0.367 (-2.97)	-0.248 (-2.01)	-0.404 (-3.22)	-0.283 (-2.34)
Victim of Crime*Avg. Crime Rate on Others	0.483 (1.67)	0.548 (1.64)	1.033 (2.75)	1.180 (3.35)
Urban (=1)	-0.249 (-5.97)	-0.251 (-6.27)	-0.276 (-6.69)	-0.281 (-7.15)
Phone in Dwelling (=1)	0.144 (4.24)	0.169 (4.80)	0.075 (2.19)	0.094 (2.72)
Race: Coloured	0.224 (3.87)	0.325 (5.70)	0.123 (2.19)	0.208 (3.96)
Race: Indian	0.004 (0.04)	0.336 (4.01)	-0.073 (-0.82)	0.248 (2.94)
Race: White	0.062 (1.34)	0.314 (6.59)	0.021 (0.45)	0.267 (5.62)
Age	-0.013 (-2.41)	-0.007 (-1.31)	-0.011 (-2.01)	-0.005 (-0.94)
Age^2/100	0.017 (2.64)	0.011 (1.70)	0.014 (2.17)	0.008 (1.24)
Married (=1)	0.091 (3.28)	0.073 (2.57)	0.093 (3.41)	0.077 (2.79)
Safety compare to last year: the same		-0.865 (-24.59)		-0.767 (-21.65)
Safety compare to last year: less safe		-2.021 (-39.84)		-1.980 (-41.19)
Province dummies (9)	Yes	Yes	Yes	Yes
Relation to head of household (9)	Yes	Yes	Yes	Yes
N	16970	16970	16970	16970
Log Likelihood	-17100.758	-15440.808	-17800.963	-16134.226
Pseudo R^2	0.044	0.137	0.042	0.131

Note: Responses to the perceived safety in own dwelling and in the neighbourhood questions are on a 4-point scale, ranging from “1.Very unsafe” to “4.Very safe”.

Table 8: Compensation Expenditure Variations (Ordered Probit Results on the Female Sample)

Compensation Expenditure Variation Per Month	Females Sample
From Crime Victim to Non-victim	R51,906.53
Respondent Characteristics	
From Black to White	R3,643.64
From Having No Phone to Have Phone	R3,267.38
From No Education to STD 10 and Higher	R2,775.91
From Unemployment (Looking) to Employment	R1,684.61
Personal Characteristics of Other Household Members	
From 100% Unemp. (Looking) to 100% Employment	R10,562.59
From 100% No Education to 100% STD 10 and Higher	R1,815.49
Average Current Household Expenditure:	R1,103.99

Note: \$1 = R4.608 in 1997 (see http://www.nationmaster.com/graph-T/eco_exc_rat/AFR).
(Document last viewed September, 2003).

Table 9: Predicted Probabilities of PQOL score of 5 (Highest Level)

Females Sample: Ordered Probit (Column 6, Table 5)	
Non-victim; regional crime rate of 0%	6.58%
Non-victim; regional crime rate of 10%	6.11%
Non-victim; regional crime rate of 20%	5.66%
Non-victim; regional crime rate of 30%	5.23%
Victim; regional crime rate of 0%	2.64%
Victim; regional crime rate of 10%	2.78%
Victim; regional crime rate of 20%	2.92%
Victim; regional crime rate of 30%	3.06%

Note: PQOL - Perceived Quality of Life.